

CLASSROOM CONTACT PROGRAMME

(ACADEMIC SESSION 2021-2022)

PRACTICE SHEET

CLASS – X (Term-1)

TARGET : CBSE BOARD EXAMINATION

SCIENCE



Corporate Office

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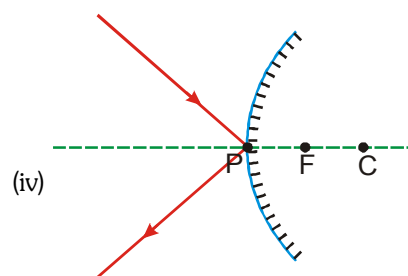
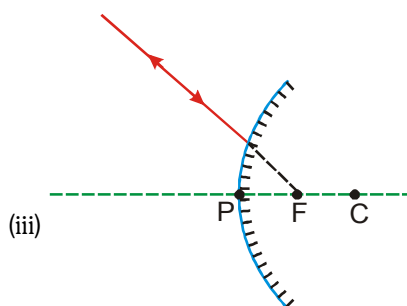
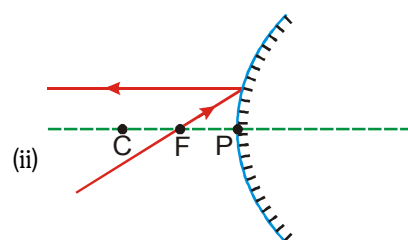
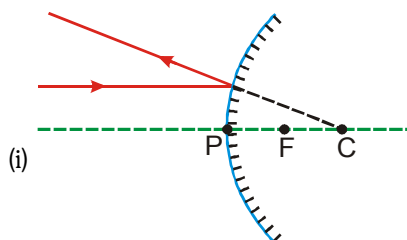
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Multiple choice question

- The image (of a real object) formed by a concave mirror is twice the size of the object. If the focal length of the mirror is 20 cm then the distance of the object from the mirror can be :
 (I) 10 cm (II) 30 cm (III) 25 cm (IV) 15 cm
 (1) Only (I) and (III) (2) Only (I) and (II) (3) Only (II) and (IV) (4) Only (III) and (IV)
- For an object placed in front of a spherical mirror, choose the incorrect statements.
 (I) A virtual, erect and diminished image can be formed using a diverging mirror.
 (II) A virtual, erect and magnified image can be formed using a diverging mirror.
 (III) A virtual, erect and magnified image can be formed using a converging mirror.
 (IV) A virtual, erect and diminished image can be formed using a converging mirror.
 (1) Only (I) and (III) (2) Only (I) and (IV) (3) Only (II) and (III) (4) Only (II) and (IV)
- Reflection of standard incident rays striking a convex mirror is shown in below mentioned figures. Then choose which among them is correct :

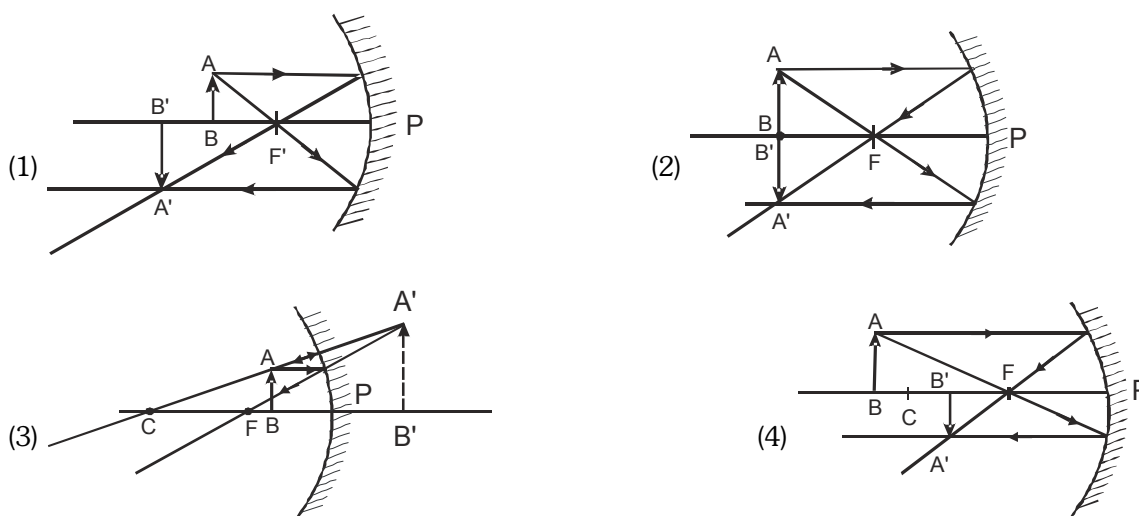


- (1) Only (i) (2) Only (iii) (3) Only (iv) (4) Only (ii)
- For a convex mirror when the object moves from infinity to the pole of the mirror, the image moves from :
 (1) Pole to infinity (2) Focus to pole (3) Focus to infinity (4) Pole to focus
 - The figure shows the positions of object O and its magnified image I . This is possible only if :



- (1) A concave mirror is placed to the right of I .
 (2) A concave mirror is placed between O and I .
 (3) A convex mirror is placed between O and I .
 (4) A convex mirror is placed to the right of I .

6. The nature of image of a candle flame placed at 40 cm in front of a spherical mirror is real, inverted and magnified four times. Then the radius of curvature of the mirror is :
 (1) 32 cm (2) 64 cm (3) 24 cm (4) 48 cm
7. An object is placed in front of a spherical mirror of focal length 15 cm. If virtual image having twice the linear dimensions of the object is formed then, the distance of the image from the focus of the mirror is :
 (1) 7.5 cm (2) 30 cm (3) 12.5 cm (4) 15 cm
8. Choose the wrong relations for a spherical mirror (symbols have their usual meaning).
 (I) $u = \frac{vf}{v - f}$ (II) $m = \frac{f}{f + u}$ (III) $m = \frac{f - v}{f}$ (IV) $v = \frac{uf}{u + f}$
 (1) Only (I) and (III) (2) Only (I) and (IV) (3) Only (II) and (III) (4) Only (II) and (IV)
9. Which of the following figure shows the use of a concave mirror as a shaving mirror?

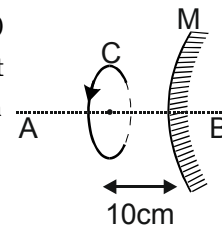


10. An extended linear object is placed perpendicular to the principal axis of a converging mirror ($f = 20$ cm) at a distance 10 cm from it. Now keeping the object fixed converging mirror is replaced by a diverging mirror ($f = 30$ cm) and kept at same position. Which of the following parameters of image will change after replacement of mirror :
 (i) Nature (real or virtual) of image (ii) size of image
 (iii) image distance from the mirror (iv) orientation (erect or inverted) of image
 (1) Only (ii) and (iii) (2) Only (i), (ii) and (iii) (3) Only (ii), (iii) and (iv) (4) Only (i), (ii) and (iv)
11. Which of the following pair of u and f in case of spherical mirror produces an image which is larger in size as compared to the object ?
 (1) $u = -10$ cm, $f = +20$ cm (2) $u = -20$ cm, $f = -30$ cm
 (3) $u = -45$ cm, $f = -10$ cm (4) $u = -60$ cm, $f = +30$ cm
12. In case of a converging mirror, when an object is placed in front of it :
 (1) its virtual image is always larger in size but its real image may be smaller or larger in size
 (2) its virtual image is always smaller in size but its real image may be smaller or larger in size
 (3) its real image is always smaller in size but its virtual image may be smaller or larger in size
 (4) its real image is always larger in size but its virtual image may be smaller or larger in size
13. When an object is placed in front of a spherical mirror, the magnification produced by it has a negative value. Then the image will be :
 (1) Virtual and erect (2) Real and erect (3) Virtual and inverted (4) Real and inverted

14. When light is incident normally then in which of the following mirrors does light retraces its own path?

- (a) Plane Mirrors (b) Concave Mirrors (c) Convex Mirrors
(1) Only (a) (2) Only (a) and (b) (3) Only (b) and (c) (4) In all mirrors

15. A particle revolves in clockwise direction (as seen from point A) in a circle 'C' of radius 10 cm. The axis of the circle and the principal axis of the convex mirror 'M' coincide. Call it AB. The radius of curvature of the mirror is 20 cm. Then the direction of revolution (as seen from A) of the image of the particle and radius of its circular path is :



- (1) Clockwise, 5 cm (2) Anticlockwise, 5 cm
(3) Clockwise, $\frac{20}{3}$ cm (4) Anticlockwise, $\frac{20}{3}$ cm

16. An object is kept at a distance of 4 m in front of a spherical mirror which forms its erect image at a distance of 1 m from the mirror. What is the magnification? Is the mirror concave or convex?

- (1) $m = 0.25$ and mirror is convex (2) $m = 0.25$ and mirror is concave
(3) $m = 0.5$ and mirror is convex (4) $m = 0.5$ and mirror is concave

17. An object is placed at a distance of 10 cm from a spherical mirror and the image is formed at a distance of 30 cm from the mirror on the same side as that of the object. Then the type of mirror used and its focal length is :

- (1) Mirror is concave and $f = 15$ cm (2) Mirror is concave and $f = 7.5$ cm
(3) Mirror is convex and $f = 15$ cm (4) Mirror is convex and $f = 7.5$ cm

18. A concave mirror of focal length 30 cm is placed at a distance of 90 cm from the wall. How far from the wall should an object be placed so as to get its real image on the wall?

- (1) 40 cm (2) 60 cm (3) 45 cm (4) 50 cm

19. An object is placed in front of a convex mirror. If its distance from pole is equal to the :

Case1: radius of curvature of the mirror,

Case2: focal length of the mirror,

then the magnification of image formed in two cases is respectively :

- (1) 0.25, 0.5 (2) 0.5, 0.33 (3) 0.75, 0.33 (4) 0.33, 0.5

20. Image is obtained on a screen by keeping an object at 25 cm and then at 40 cm in front of a concave mirror. Image in the former case is four times bigger than in the latter. Then the focal length of the mirror must be :

- (1) 12 cm (2) 20 cm (3) 24 cm (4) 36 cm

Assertion-Reasoning (Q.21 to 24)

- (1) If both assertion and reason are true and the reason is the correct explanation of assertion.
(2) If both assertion and reason are true but the reason is not a correct explanation of assertion.
(3) If assertion is true and reason is false.
(4) If assertion is false and reason is true.

21. **Assertion :** Keeping a point object fixed, if a plane mirror is moved towards the object, the image will also move.

Reason : In case of a plane mirror, distance of object and its image is equal from any point on the mirror.

22. **Assertion :** Plane mirror may form real image.

Reason : Plane mirror form virtual image, if objects is real.

23. Assertion : A ray of light incident along the normal to the plane mirror retraces its path after reflection from the mirror.

Reason : A ray of light along the normal has angle of incidence of 90 degree and hence, it retraces its own path after reflection from mirror.

24. Assertion : Concave mirrors are used as make-up mirrors.

Reason : When the face is held within the focus of a concave mirror, then a diminished image of the face is seen in the concave mirror.

Case based mcqs

25. Renu adjusts a mirror in her hand to obtain a clear but smaller image of a candle flame on a white screen placed in front of the mirror.

Raman, a friend of Renu conducts an experiment using Renu's mirror and obtains the image of very distant object clearly when screen is placed at 5 cm in front of the this mirror.

(i) What type of mirror has Renu used ?

- (1) Plane (2) Concave (3) Convex (4) Plane or concave

(ii) What type of image of the candle flame is obtained on the screen ?

- (1) Real and erect (2) Virtual and erect (3) Real and inverted (4) Virtual and inverted

(iii) If Renu covers the upper half of the mirror's reflecting surface with a black paper, what will happen?

- (1) Image will disappear
(2) Only half the image is formed
(3) Whole image is formed but with less brightness
(4) Whole image is formed but with more brightness

(iv) Radius of curvature of the mirror is

- (1) 25 cm (2) 5 cm (3) 10 cm (4) 15cm

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	4	3	2	2	2	2	4	3	1	2	1	4	4	1
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	1	2	3	4	2	1	2	3	3	2	3	3	3		

Multiple choice question

1. Where should an object be placed in front of a convex lens to get a real image of the same size of the object?
 (1) at the principal focus of the lens
 (2) At twice the focal length
 (3) At infinity
 (4) Between the optical centre of the lens and its principal focus.
2. Which of the following lenses would you prefer to use while reading small letters found in a dictionary?
 (1) A convex lens of focal length 50 cm. (2) A concave lens of focal length 50 cm.
 (3) A convex lens of focal length 5 cm (4) A concave lens of focal length 5 cm
3. One light wave is incident upon a thick plate of refractive index μ . Incident angle i , for which refracted and reflected waves are mutually perpendicular, will be
 (1) $i = 45^\circ$ (2) $i = \sin^{-1} \mu$ (3) $i = \operatorname{cosec}^{-1} \mu$ (4) $i = \tan^{-1} \mu$
4. An object is situated at a distance of $f/2$ from a convex lens of focal length f . Distance of image from the lens will be
 (1) $+(f/2)$ (2) $+(f/3)$ (3) $+(f/4)$ (4) $-f$
5. If the refractive indices for water and diamond relative to air are 1.33 and 2.4 respectively, then the refractive index of diamond relative to water is
 (1) 0.55 (2) 1.80 (3) 3.19 (4) none of these
6. There is an equiconvex lens of focal length of 20 cm. If the lens is cut into two equal parts perpendicular to the principal axis, the focal length of each part will be
 (1) 20 cm (2) 10 cm (3) 40 cm (4) 15 cm
7. Light waves
 (1) require air or another gas to travel through (2) Require an electric field to travel through
 (3) Require a magnetic field to travel through (4) Can travel even through perfect vacuum
8. A number of images of a candle flame can be seen in a thick mirror. The brightest image is
 (1) Fourth (2) Second (3) Last (4) First
9. Light ray from air enters obliquely into water, then through a thick layer of glass placed below water. After passing through glass, it again comes out in the air medium. Then final emergent ray will :
 (1) Bend towards the normal
 (2) Bend away from the normal
 (3) Not suffer lateral displacement
 (4) Have the same path as if it had not passed through glass and water
10. Light is incident from air into a medium at an angle of incidence of 60° . What angle does the refracted ray make with the normal? (R.I. of medium = $\sqrt{3}$)
 (1) 30° (2) 60° (3) 45° (4) 90°
11. An object is placed at 10 cm from a diverging lens which forms an image at 6.5 cm from the lens. What is the focal length of the lens?
 (1) +3.9 cm (2) -16.5 cm (3) -21.2 cm (4) -18.6 cm

12. Under what conditions does a diverging lens form a virtual image of a real object?
- only if $u > f$
 - only if $u < f$
 - only if $u = f$
 - A diverging lens always forms a virtual image of a real object
13. A lens produces an enlarged, virtual image. What kind of lens is it?
- Converging only
 - diverging only
 - it could be either diverging or converging
 - Lens of zero power
14. A camera lens focuses light from a 12 m tall building located 35 m away from the lens on a film 50 mm behind the lens. How tall is the image of the building on the film?
- 17.1 mm
 - 7 mm
 - 2.5 mm
 - 1.25 mm
15. In an experiment to determine the focal length of a concave lens, a student obtained the image of a distant window on the screen. To determine the focal length of the lens, she should measure the distance between the
- Lens and the screen only
 - Lens and the window only
 - Screen and the window only
 - Screen and the lens and also between the screen and the window
16. On the basis of experiment "To trace the path of a ray of light passing through a rectangular glass slab", four students arrived at the following interpretations:
- Angle of incidence is greater than the angle of emergence
 - Angle of emergence is less than the angle of refraction
 - Emergent ray is parallel to the incident ray
 - Emergent ray is parallel to the first refracted ray
- The correct interpretation is that of the student
- I
 - II
 - III
 - IV
17. A glass slab is placed in the path of a beam of convergent light, then the point of convergence of light
- moves towards the glass slab
 - Moves away from the glass slab
 - Remains at the same point
 - Undergoes a lateral shift
18. When light passes from air into glass, it does not experience a change of
- Speed
 - Both wavelength and speed
 - frequency
 - wavelength
19. All the rays passing through the optical centre of a concave lens will go
- through F
 - parallel
 - Undeviated
 - Through 2F
20. The angle of incidence i and the angle of refraction r are equal when light from air enters into a transparent glass slab. The value of i is
- 0°
 - 45°
 - 90°
 - depend on the material of the slab

Assertion Reason Questions (Q.21 to 24)

- If both assertion and reason are correct and reason is the correct explanation of the assertion
- If both assertion and reason are correct but reason is not the correct explanation of the assertion
- If assertion is true but reason is false
- If assertion is false but reason is true

21. **Assertion:** As light travels from one medium to another, the frequency of light does not change.

Reason: because frequency is the characteristic of source.

22. **Assertion:** Red light travels faster in glass than green light.

Reason: The refractive index of glass is less for red light than for green light.

23. **Assertion:** As the temperature of a medium changes the refractive index changes.

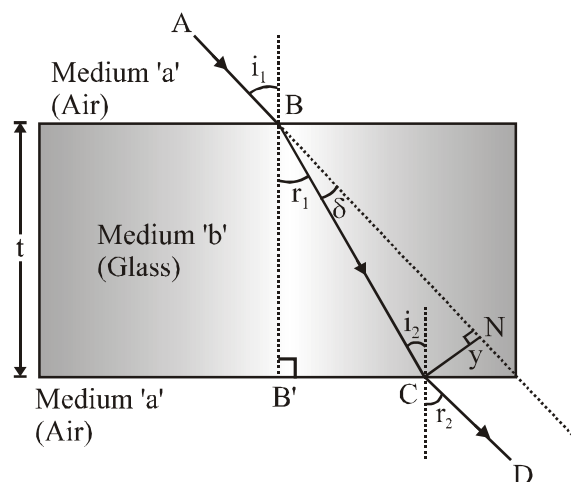
Reason: When a ray travels from vacuum to a medium then μ is called as absolute refractive index of the medium.

24. **Assertion:** A virtual image produced by convex lens can be photographed.

Reason: A real image formed by convex lens can be formed on the screen.

Case based mcqs

25. Consider a ray of light AB passing from air (medium a) through a parallel sided glass slab (medium b) into air (medium a). The ray of light will clearly suffer two refractions. Since the medium on both sides of glass is the same therefore the ray of light will get laterally shifted without any deviation.



When ray of light is refracted from air to glass, then the refractive index of glass (medium b) w.r.t. air (medium a) is given by

$$n_{ba} = \frac{\sin i_1}{\sin r_1} \quad \dots\dots(1)$$

Also, the refractive index of air w.r.t. glass is given by

$$n_{ab} = \frac{\sin i_2}{\sin r_2} \quad \dots\dots(2)$$

(i) If the absolute refractive index of glass is $3/2$, then the speed of light in glass will be

- | | |
|----------------------------|----------------------------|
| (1) 6.7×10^8 km/s | (2) 4.5×10^5 km/s |
| (3) 2×10^5 km/s | (4) 2×10^8 km/s |

(ii) If in the discussed phenomenon, the emergent ray strikes perpendicularly to a plane mirror placed in its passage, then

- (1) the emergent ray will reflect at an angle of reflection of r_2 .
- (2) the emergent ray will retrace its path.
- (3) the emergent ray will reflect at an angle of reflection of 0° .
- (4) Both (2) and (3) are correct.

(iii) According to Snell's law of refraction, the correct relation for the given glass slab is:

(1) $n_{ba} \times \sin i_1 = n_{ab} \times \sin r_1$

(2) $n_{ba} \times n_{ab} = 1$

(3) $n_{ba} = n_{ab}$

(4) Both (1) and (2)

(iv) Consider that the glass slab is replaced with an another slab of different transparent material of same thickness and of refractive index $\sqrt{2}$. When a light ray enters the new material slab at an angle of incidence of 45° , the angle of refraction for the ray will be

(1) 30°

(2) 60°

(3) 90°

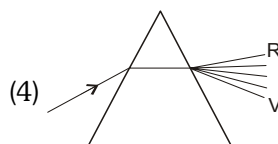
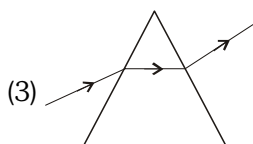
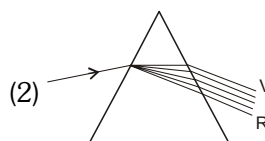
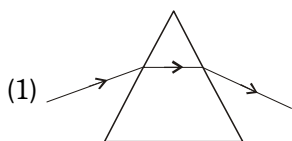
(4) 45°

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	3	4	4	2	3	4	2	2	1	4	4	1	1	1
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	3	2	3	3	1	1	1	2	2	3	4	2	1		

Multiple choice question

- When a beam of sunlight becomes visible in a dark, misty room, the phenomenon is called
 (1) atmospheric refraction (2) tyndall effect
 (3) reflection (4) dispersion
- Which of the following colour is scattered least ?
 (1) violet (2) blue (3) green (4) red
- To an observer on the earth, the stars appear to twinkle. This can be ascribed to :
 (1) The fact that stars do not emit light continuously
 (2) Frequency absorption of star light by their own atmosphere
 (3) Frequency absorption of star light by the earth's atmosphere
 (4) The refractive index fluctuations in the earth's atmosphere
- Which of these phenomena is not responsible for the formation of a rainbow ?
 (1) Refraction (2) Scattering
 (3) Dispersion (4) Total internal reflection
- Which of the following is correct when light from a LASER passes through prism :



- Angle of prism is :
 (1) angle between any one of its refracting face & base
 (2) angle between refracting faces of the prism
 (3) angle between incident ray & normal at that point
 (4) none of these
- Dispersion is :
 (1) phenomena of combination of more than one colours of light
 (2) phenomena of splitting up of white light into seven different colours
 (3) both
 (4) none of them
- From which point of a waterfall can a person see a rainbow, when it is noon ?
 (1) From the bottom of the waterfall
 (2) From the top of the waterfall
 (3) From the sides of the waterfall
 (4) From any point around the waterfall

9. At sunset, the sun seems to be
 (1) exactly where it really is. (2) higher than it really is.
 (3) lower than it really is. (4) lower than it would be at sunrise.

10. The sky is blue because :
 (1) There is more blue light in the sunlight
 (2) Of the scattering of sunlight by air molecules in the atmosphere
 (3) Other colours are absorbed by heavenly bodies
 (4) None of these

Assertion-Reasoning (Q.11 to 14)

- (1) If both assertion and reason are true and the reason is the correct explanation of assertion.
 (2) If both assertion and reason are true but the reason is not a correct explanation of assertion.
 (3) If assertion is true and reason is false.
 (4) If assertion is false and reason is true.
11. **Assertion :** The light of violet colour deviates the most and the light of red colour the least, while passing through a prism.
Reason : For a prism material, refractive index is highest for red light and lowest for the violet light.
12. **Assertion :** The phenomenon of scattering of light by colloidal particle gives rise to tyndall effects.
Reason : The colour of the scattered light depends on the size of scattering particles.
13. **Assertion :** Secondary rainbow is fainter than primary rainbow.
Reason : Secondary rainbow formation is three step process and hence, the intensity of light is reduced at the second reflection inside the rain drop.
14. **Assertion :** The stars twinkle while the planet do not.
Reason : The stars are much bigger in size than the planets.

Case based mcqs

15. In the spectrum/after dispersion from prism, white light splits into seven colours namely violet, indigo, blue, green, yellow, orange and red. The phenomenon of splitting up of white light into its constituent colours is called 'dispersion of light'.
- (i) Which colour will have maximum velocity inside the prism?
 (1) Red (2) Green (3) Yellow (4) Orange
- (ii) Which colour will have maximum wavelength while passing through prism?
 (1) Violet (2) Green (3) Yellow (4) Red
- (iii) Which colour will have maximum deviation when white light enters the prism?
 (1) Violet (2) Green (3) Yellow (4) Red
- (iv) The frequency of visible light spectrum is less than that of :
 (1) Ultraviolet rays (2) Radio waves (3) Infrared rays (4) None of these

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	2	4	4	2	1	2	2	2	2	2	3	2	1	2
Que.	15(i)	15(ii)	15(iii)	15(iv)										
Ans.	1	4	1	1										

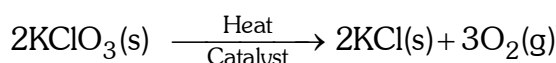
Multiple choice question

- A substance which oxidises itself and reduces other is known as -
(1) oxidising agent (2) reducing agent (3) both of these (4) None of these
- When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of -
(1) a combination reaction (2) a displacement reaction
(3) a decomposition reaction (4) a double decomposition reaction
- What happens when copper rod is dipped in iron sulphate solution?
(1) Copper displaces iron
(2) Blue colour of copper sulphate solution is obtained
(3) No reaction takes place
(4) Reaction is exothermic
- A dilute solution of sodium carbonate was added to two test tubes - one containing dil HCl (A) and the other containing dilute NaOH (B). The correct observation was -
(1) a brown coloured gas liberated in test tube A
(2) a brown coloured gas liberated in test tube B
(3) a colourless gas liberated in test tube A
(4) a colourless gas liberated in test tube B
- The equation
$$\text{Cu} + x\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + y\text{NO}_2 + 2\text{H}_2\text{O}$$

The values of x and y are -
(1) 3 and 5 (2) 8 and 6 (3) 4 and 2 (4) 7 and 1
- When the gases sulphur dioxide and hydrogen sulphide are mixed in the presence of water, the reaction is $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$. Here hydrogen sulphide is acting as -
(1) an oxidising agent (2) a reducing agent
(3) a dehydrating agent (4) a catalyst
- In the following equations -
$$\text{Na}_2\text{CO}_3 + x\text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$$
, the value of x is -
(1) 1 (2) 2 (3) 3 (4) 4
- $$\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$$

The above reaction is an example of a -
(1) combination reaction (2) double displacement reaction
(3) decomposition reaction (4) displacement reaction
- When $\text{Ca}(\text{NO}_3)_2$ is heated, it gives CaO , $\text{NO}_2(\text{g})$ and $\text{O}_2(\text{g})$. The correct number of moles of $\text{Ca}(\text{NO}_3)_2$, CaO , $\text{NO}_2(\text{g})$ and $\text{O}_2(\text{g})$ present in the reaction are respectively
(1) 2, 1, 3, 2 (2) 2, 2, 4, 1 (3) 2, 2, 2, 1 (4) 1, 2, 4, 1
- Which of the following reaction is characterised by the yellow colour of product?
(1) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ (2) $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$
(3) $2\text{Pb}_3\text{O}_4 \xrightarrow{\Delta} 6\text{PbO} + \text{O}_2$ (4) $2\text{KClO}_3 \xrightarrow{\Delta} 2\text{KCl} + 3\text{O}_2$

11. A reddish brown coloured metal used in electric wires, when powdered and heated strongly in an open China dish, its colour turns black. When hydrogen gas is passed over this black substance, it regain its original colour. Based on this information, the metal and black coloured substances are
- (1) copper and copper nitrate (2) silver and silver oxide
(3) copper and copper oxide (4) aluminium and aluminium oxide
12. When dilute sulphuric acid is added to pieces of iron sulphide, hydrogen sulphide gas is produced and soluble ferrous sulphate is formed. The type of chemical reaction involved is
- (1) decomposition reaction (2) combination reaction
(3) displacement reaction (4) double displacement reaction
13. Following reaction is used for the preparation of oxygen gas in the laboratory.



Which of the following statement (s) is (are) correct about the reaction?

- (1) It is a decomposition reaction and endothermic in nature
(2) It is a combination reaction
(3) It is a decomposition reaction and accompanied by the release of heat
(4) It is a photochemical decomposition reaction and exothermic in nature
14. Three beakers labelled as A, B and C each containing 25 ml of water were taken. A small amount of NaOH, anhydrous CuSO_4 and NaCl were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solution contained in beakers A and B, whereas in case of beakers C, the temperature of the solution falls. Which one of the following statement(s) is (are) correct?
- (i) In beakers A and B, exothermic process has occurred.
(ii) In beakers A and B, endothermic process has occurred
(iii) In beaker C, exothermic process has occurred
(iv) In beaker C, endothermic process has occurred.
- (1) (i) only (2) (ii) only (3) (i) and (iv) (4) (ii) and (iii)
15. Which of the following is a physical change.
- (1) Breaking of glass (2) Combustion of fuel (3) Cooking of food (4) All of these
16. Which among the following is(are) double displacement reaction (s)?
- (i) $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$ (ii) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
(iii) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ (iv) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- (1) (i) and (iv) (2) (ii) only (3) (i) and (ii) (4) (iii) and (iv)
17. Which among the following statement(s) is (are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to
- (i) the formation of silver by decomposition of silver chloride
(ii) sublimation of silver chloride
(iii) decomposition of chlorine gas from silver chloride
(iv) oxidation of silver chloride
- (1) (i) only (2) (i) and (iii) (3) (ii) and (iii) (4) (iv) only
18. Electrolysis of water is a decomposition reaction. The molar ratio of hydrogen and oxygen gases liberated during electrolysis of water is
- (1) 1 : 1 (2) 2 : 1 (3) 4 : 1 (4) 1 : 2

19. Which of the following is (are) an endothermic process (es)?

- (i) Dilution of sulphuric acid (ii) Sublimation of dry ice
(iii) Condensation of water vapour (iv) Evaporation of water
(1) (i) and (iii) (2) (ii) only (3) (iii) only (4) (ii) and (iv)

20. Lime water turns milky when carbon dioxide gas is passed through it. The milkiness is due to the formation of

- (1) $\text{Ca}(\text{HCO}_3)_2$ (2) $\text{Ca}(\text{OH})_2$ (3) CaCO_3 (4) All of these

Assertion-reason (Q.21 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
(2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
(3) If assertion is true but reason is false
(4) If assertion is false but reason is true

21. **Assertion (A) :** $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$. This reaction is a displacement reaction.

Reason (R) : The reaction in which a more reactive metal displaces less reactive metal is called displacement reaction.

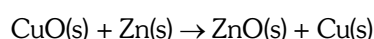
22. **Assertion (A) :** Brown fumes are produced when lead nitrate is heated.

Reason (R) : Nitrogen dioxide gas is produced as a by product due to the decomposition of lead nitrate.

23. **Assertion (A) :** Pungent smelling gas is produced when sulphur burns in air.

Reason (R) : Sulphur trioxide is formed on reaction of sulphur with oxygen.

24. **Assertion (A) :** In the following chemical equation,



Zinc is getting oxidised and copper oxide is getting reduced.

Reason (R) : The process in which oxygen is added to a substance is called oxidation whereas the process in which oxygen is removed from a substance is called reduction.

Case based mcqs

25. There are different types of chemical reactions occurring around us or being carried out for the benefit of mankind, e.g. combination reactions, decomposition reactions, displacement reactions, precipitation reactions, reduction oxidation (redox) reactions, photochemical reactions, etc.

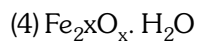
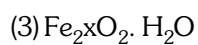
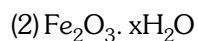
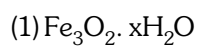
(i) Which of the following reactions is not correct?

- (1) $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$ (2) $2\text{Ag} + \text{Cu}(\text{NO}_3)_2 \longrightarrow 2\text{AgNO}_3 + \text{Cu}$
(3) $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$ (4) $\text{Mg} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2$

(ii) Which type of reaction is involved in white wash of walls?

- (1) Displacement reaction (2) Combination reaction
(3) Redox reaction (4) Decomposition reaction

(iii) What is the formula of rust?



(iv) The colour of magnesium oxide produced on burning Mg in air is :-

(1) Blue

(2) Green

(3) Grey

(4) White

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	4	3	3	3	2	2	4	2	3	3	4	1	3	1
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	2	1	2	4	3	1	1	3	1	2	2	2	4		

Multiple choice question

1. Which salt is a neutral salt ?
(1) NH_4Cl (2) $\text{CH}_3\text{COONH}_4$ (3) CH_3COONa (4) Na_2CO_3
2. Methyl orange is :
(1) Red in acidic medium, yellow in basic medium
(2) Yellow in acidic medium, pink in basic medium.
(3) Colourless in acidic medium, pink in basic medium.
(4) Pink in acidic medium, blue in basic medium.
3. Which one of the following salts does not contain water of crystallisation?
(1) Blue vitriol (2) Baking soda (3) Washing soda (4) Gypsum
4. What is formed when zinc reacts with sodium hydroxide?
(1) Zinc hydroxide and sodium
(2) Sodium zincate and hydrogen gas
(3) Sodium zinc-oxide and hydrogen gas
(4) Sodium zincate and water
5. Tomato is a natural source of which acid?
(1) Acetic acid (2) Citric acid (3) Tartaric acid (4) Oxalic acid
6. Brine is an
(1) aqueous solution of sodium hydroxide (2) aqueous solution of sodium carbonate
(3) aqueous solution of sodium chloride (4) aqueous solution of sodium bicarbonate
7. Which of the following is not a strong base?
(1) NaOH (2) NH_4OH (3) KOH (4) $\text{Ba}(\text{OH})_2$
8. At what temperature is gypsum heated to form Plaster of Paris?
(1) 90°C (2) 100°C (3) 180°C (4) 220°C
9. How many water molecules does hydrated calcium sulphate contain?
(1) 5 (2) 10 (3) 7 (4) 2
10. Alkalis are
(1) acids, which are soluble in water (2) acids, which are insoluble in water
(3) bases, which are insoluble in water (4) bases, which are soluble in water
11. The nature of sodium carbonate is
(1) Acidic (2) Basic (3) Neutral (4) Amphoteric
12. Nettle sting is a natural source of which acid?
(1) Methanoic acid (2) Lactic acid (3) Citric acid (4) Tartaric acid
13. What is the pH range of our body?
(1) 7.0 – 7.8 (2) 7.2 – 8.0 (3) 7.0 – 8.4 (4) 7.2 – 8.4
14. Rain is called acid rain when its:
(1) pH falls below 7 (2) pH falls below 6 (3) pH falls below 5.6 (4) pH is above 7
15. Sodium hydroxide is a
(1) weak base (2) weak acid (3) strong base (4) strong acid

16. An aqueous solution turns red litmus solution blue. Its pH should be ?
(1) =7 (2) < 7 (3) = 3 (4) >7
17. When copper oxide and dilute hydrochloric acid react, colour changes to
(1) white (2) bluish-green
(3) Red (4) black
18. Chemical formula of washing soda is
(1) $\text{Na}_2\text{CO}_3 \cdot 7\text{H}_2\text{O}$ (2) $\text{Na}_2\text{CO}_3 \cdot 5\text{H}_2\text{O}$ (3) $\text{Na}_2\text{CO}_3 \cdot 2\text{H}_2\text{O}$ (4) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
19. Which of the following is not a product of the electrolysis of an aq solution of Sodium chloride:
(1) Sodium Hydroxide (2) Oxygen gas (3) Hydrogen gas (4) Chlorine gas

Assertion-reason (Q.20 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
(2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
(3) If assertion is true but reason is false
(4) If assertion is false but reason is true
20. **Assertion (A) :** The acid must always be added to water with constant stirring.
Reason (R) : Mixing of an acid with water decreases the concentration of H^+ ions per unit volume.
21. **Assertion (A) :** The aqueous solutions of glucose and alcohol do not show acidic character.
Reason (R) : Aqueous solutions of glucose and alcohol do not give H^+ ions.
22. **Assertion (A) :** Weak acids have low electrical conductivity.
Reason (R) : Strong acids and weak acids have equal concentration of hydrogen ions in their solutions.
23. **Assertion (A) :** Pure water is neither acidic nor basic.
Reason (R) : The pH of a solution is inversely proportional to the concentration of hydrogen ions in it.
24. **Assertion (A) :** Baking powder is used in making cake instead of using only baking soda.
Reason (R) : Baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.

Case based mcqs

25. The pH scale can be used to determine the strength of acid solutions as well as basic solutions by making use of hydrogen ion concentrations in them. Consider two solutions A and B having pH values 3 and 9.5, respectively.
- (i) What effect does the concentration of H^+ ions have on the nature of the solution?
- Higher the concentration of H^+ ions, greater is the acidic nature of the solution
 - Higher the concentration of H^+ ions, greater is the basic nature of the solution
 - Concentration of H^+ ions does not effect the nature of the solution
 - None of these
- (ii) Which solution will turn phenolphthalein from colourless to pink?
- Solution A
 - Solution B
 - Both (1) and (2)
 - None of these
- (iii) Which of the following substances would have pH less than 7?
- Antacid
 - Soap
 - Vinegar
 - Water
- (iv) What happens when dilute hydrochloric acid is added to iron filling?
- Hydrogen gas and iron chloride are produced
 - Chlorine gas and hydrogen gas evolved
 - Iron salt and water produced
 - No reaction takes place

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	1	2	2	4	3	2	2	4	4	2	1	1	3	3
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	4	2	4	2	2	1	3	2	1	1	2	3	4		

Multiple choice question

1. Ritika took four metals P, Q, R and S and added them to following solutions one by one. The results are summarised in the given table.

Metal	$FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$
P	×	✓	×	✓
Q	✓	✓	✓	✓
R	×	✓	×	✓
S	×	×	×	×

Which of the following statements are correct?

I. Q is the most reactive metal among the given elements

II. Among the given metals, S is the most reactive metal.

III. R is less reactive than Ag but more reactive than Zn.

IV. P is more reactive than Cu but less reactive than Fe.

(1) I and III only (2) II and IV only (3) I and IV only (4) II and III only

2. Read the given statements carefully.

I. Metals are generally ductile and metal W is the most ductile metal.

II. Metals generally possess high melting points but few metals like X have low melting point.

III. Metals are good conductors of electricity but metal Y is very poor conductor of electricity.

IV. Among metals, Z is the poorest conductor of heat.

W, X, Y and Z can be respectively

(1) Aluminium, sodium, lead and silver (2) Gold, potassium, tungsten and lead
(3) Copper, zinc, silver and mercury (4) Iron, sodium, gold and lead.

3. Which of the following elements liberate hydrogen on reacting with diluted nitric acid?

(1) Zn and Mg (2) Mn and Sn (3) Mg and Mn (4) Mn and Fe

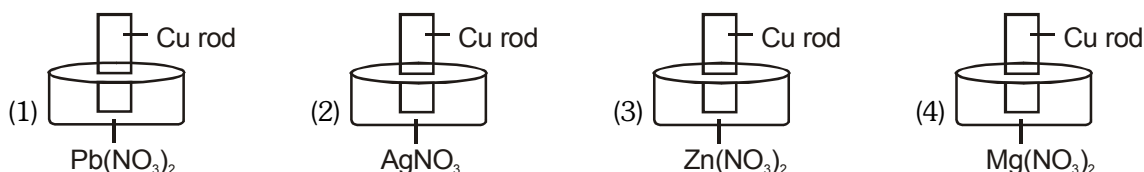
4. Few metals are given below. Zn, Sn, Ag, Na, Ca Arrange the above given metals from least reactive to most reactive.

(1) $Sn < Na < Zn < Ca < Ag$ (2) $Ag < Zn < Sn < Na < Ca$ (3) $Ag < Sn < Zn < Ca < Na$ (4) $Zn < Sn < Ag < Ca < Na$

5. The metals that float when treated with water are

(1) Mn and Na (2) Na and Ca (3) Mg and Na (4) Mg and Ca

6. Four colourless salt solutions given in the figures are placed in separate containers and a copper rod is dipped in each. In which container does the solution turn blue?



7. Which of the following are not ionic compounds?

(i) KCl (ii) HCl (iii) CCl_4 (iv) NaCl
(1) (i) and (ii) (2) (ii) and (iii) (3) (iii) and (iv) (4) (i) and (iii)

8. The electronic configuration of three elements X, Y and Z are as follows:
 $X = 2, 4$, $Y = 2, 7$, $Z = 2, 1$ Which two elements will combine to form an ionic compound and write the correct formula,
 (1) X_2Y (2) ZY (3) XZ_3 (4) XY_4
9. Out of these, which one is most reactive with water ?
 (1) Sodium (2) Magnesium (3) Iron (4) Copper
10. Which one among the following is an acidic oxide?
 (1) Na_2O (2) CO (3) CO_2 (4) Al_2O_3
11. The metals which have very low melting points are:
 (1) Gallium and cesium (2) Gallium and iron
 (3) Cesium and aluminium (4) Sodium and magnesium
12. The major metals in the earth's crust in the decreasing order of their abundance are:
 (1) Sodium > Potassium > Magnesium > Iron > Calcium > Aluminium.
 (2) Sodium > Aluminium > Potassium > Magnesium > Iron > Calcium.
 (3) Aluminium > Iron > Calcium > Sodium > Potassium > Magnesium.
 (4) Iron > Calcium > Aluminium > Sodium > potassium > Magnesium.

13. Column-A	Column-B
(i) Ductile	(p) The property of making resonating sound.
(ii) Malleable	(q) A substance can be drawn into wires.
(iii) Sonority	(r) The substance can be beaten into thin sheets.
(iv) Tensile strength	(s) Ability to withstand the longitudinal pull.

Choose the right match

- (1) $i \rightarrow p$, $ii \rightarrow q$, $iii \rightarrow r$, $iv \rightarrow s$ (2) $i \rightarrow q$, $ii \rightarrow r$, $iii \rightarrow p$, $iv \rightarrow s$
 (3) $i \rightarrow s$, $ii \rightarrow p$, $iii \rightarrow q$, $iv \rightarrow r$ (4) $i \rightarrow r$, $ii \rightarrow s$, $iii \rightarrow p$, $iv \rightarrow q$
14. A brief information about a few elements is given below:
 P: It is used in making electrodes. Q: It is required for combustion.
 R: It is used to prevent rancidity. S: It is used as fungicide.
 P, Q, R and S are respectively
 (1) Aluminium, carbon, oxygen and phosphorus (2) Copper, oxygen, hydrogen and iodine
 (3) Carbon, oxygen, nitrogen and sulphur (4) Sulphur, oxygen, nitrogen and hydrogen.
15. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?
 (i) Good thermal conductivity
 (ii) Good electrical conductivity
 (iii) Ductility
 (iv) High melting point
 (1) (i) and (ii) (2) (i) and (iii) (3) (ii) and (iii) (4) (i) and (iv)
16. On the basis of the sequence of the given reactions. Identify the most and least reactive elements respectively;
 $X + YA \longrightarrow XA + Y$
 $Z + XA \longrightarrow ZA + X$
 (1) X and Z (2) Y and Z (3) Z and X (4) Z and Y

17. 2mL each of concentrated HCl, HNO_3 and a mixture of concentrated HCl and concentrated HNO_3 in the ratio of 3: 1 were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C respectively. The metal could be
- (1) Al (2) Au (3) Cu (4) Na
18. The aqueous solution of copper sulphate and zinc sulphate appear;
- (1) Blue and green respectively (2) Green and colourless respectively
(3) Blue and brown respectively (4) Blue and colourless respectively
19. In order to resemble neon, oxygen needs to
- (1) lose one electron (2) gain one electron
(3) lose two electrons (4) gain two electrons

Assertion-reason (Q.20 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
(2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
(3) If assertion is true but reason is false
(4) If assertion is false but reason is true
20. **Assertion (A)** : Magnesium reacts with oxygen upon heating and burns brightly to form magnesium oxide.
Reason (R) : Magnesium oxide is basic in nature.
21. **Assertion (A)** : Hydrogen gas is not evolved when a metal reacts with nitric acid.
Reason (R) : Nitric acid is a strong oxidising agent.
22. **Assertion (A)** : Sodium metal can be cut with a knife
Reason (R) : Bromine is a liquid non-metal
23. **Assertion (A)** : Zinc oxide is amphoteric in nature.
Reason (R) : Zinc oxide reacts with both acids and bases.
24. **Assertion (A)** : The reaction of calcium with water is less violent in comparison to that of sodium.
Reason (R) : The heat evolved is not sufficient for the hydrogen to catch fire.

Case based mcqs

25. From the position of the aluminium (Al) metal in the activity series it seems to be quite reactive than the metals below it. When the metal is kept in air or oxygen for sometime, a layer of Al_2O_3 gets deposited as the surface of the metal as a thin coating. It is rather passive which means that it is not reactive. The metal is also used for packing food articles.
- (i) Which is the correct order of reactivity series?
- (1) $\text{Al} < \text{Mg} < \text{Na} < \text{K}$ (2) $\text{K} < \text{Na} < \text{Al} < \text{Mg}$ (3) $\text{K} < \text{Mg} < \text{Na} < \text{Al}$ (4) $\text{Mg} < \text{Al} < \text{K} < \text{Na}$

(ii) Choose the correct match of the following :

(a) Sodium

(i) Quick lime

(b) Aluminium

(ii) Kept in kerosene

(c) Calcium

(iii) Wrapping food

a

b

c

(1) (i)

(ii)

(iii)

(2) (ii)

(iii)

(i)

(3) (iii)

(i)

(ii)

(4) (ii)

(i)

(iii)

(iii) Which property of aluminium is used in making foils ?

(1) Ductility

(2) Malleability

(3) Sonority

(4) Lustrous

(iv) Which metal is less reactive than Al ?

(1) Na

(2) Ca

(3) Cu

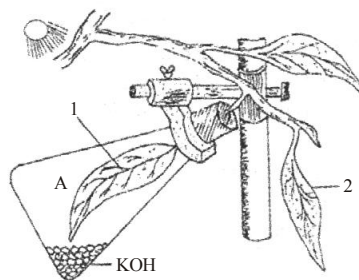
(4) Mg

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	3	2	3	3	4	2	2	2	1	3	1	3	2	3	4
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	4	2	4	4	2	1	2	1	1	1	2	2	3		

Multiple choice questions

- The function of tongue is to–
 - (1) Help in the act of swallowing
 - (2) Help in mixing saliva with the food
 - (3) Help in speaking
 - (4) All of these
- Stomach in vertebrates is the main site for digestion of–
 - (1) Proteins
 - (2) Carbohydrates
 - (3) Fats
 - (4) Nucleic acid
- Amylase is an enzyme used to aid in the chemical digestion of–
 - (1) Proteins
 - (2) Carbohydrates
 - (3) Lipids
 - (4) Water
- A series of wavelike muscle contractions that bring food down the esophagus into the stomach is called–
 - (1) Pepsin
 - (2) Peristalsis
 - (3) Dehydration synthesis
 - (4) Angina
- Emulsification is–
 - (1) The digestion of proteins in the stomach
 - (2) The physical breakdown of fat in the small intestines
 - (3) The digestion of carbohydrates in the mouth
 - (4) The removal of undigested food from the rectum
- The teacher instructed a student to place a healthy potted shoe flower plant in a dark room for 24 hours prior to an experiment on photosynthesis. The purpose of placing in a dark room is–
 - (1) To increase the intake of CO_2
 - (2) To activate the chloroplasts in the leaves
 - (3) To de-starch the leaves
 - (4) To denature the enzymes in the leaves
- Autotrophic organisms include–
 - (1) Bacteria and virus
 - (2) Bacteria and fungi
 - (3) Green plants and some bacteria
 - (4) Green plants and all bacteria
- An enzyme that acts only in acidic medium is–
 - (1) Pepsin
 - (2) Ptyalin
 - (3) Trypsin
 - (4) Amylase
- Which is the first part of the small intestine?
 - (1) Ileum
 - (2) Jejunum
 - (3) Duodenum
 - (4) Caecum
- The process in which water splits during photosynthesis is–
 - (1) Plasmolysis
 - (2) Photolysis
 - (3) Osmosis
 - (4) Glycolysis
- The figure given below represents an experiment to demonstrate a particular aspect of photosynthesis. The alphabet 'A' represents a certain condition inside the flask. What is the aim of the experiment?



- (1) To prove sunlight is necessary for photosynthesis.
- (2) To prove water is necessary for photosynthesis.
- (3) To prove carbon dioxide is necessary for photosynthesis.
- (4) To prove chlorophyll is necessary for photosynthesis.

12. Which of the given options would be the best explanation of holozoic nutrition?
- (1) When an organism makes its own food from the simple inorganic materials like carbon dioxide and water present in surrounding with the help of sunlight energy.
 - (2) When an organism takes the complex organic food material into its body by the process of ingestion, the ingested food is digested and then absorbed into the body cells of organism.
 - (3) When an organism cannot make its own food from simple inorganic materials like carbon dioxide and water and depends on other organisms for its food.
 - (4) When an organism obtains its food from decaying organic matter of dead plants, dead animals and rotten bread.

13. Match column-I with column-II and select the correct answer using the code given below the columns

Column-I

Column II

- | | |
|--|--|
| (1) Stomach | (p) The structure is the site where the chemical breakdown of proteins first occurs |
| (2) Large intestine | (q) This organ absorbs water from the undigested food. |
| (3) Small intestine | (r) This organ is the section of the alimentary canal where most of the food is absorbed into the blood. |
| (4) Liver | (s) This organ secretes the digestive juice bile, which is used to emulsify fats |
| (1) (1) – p, (2) – q, (3) – r, (4) – s | (2) (1) – q, (2) – r, (3) – p, (4) – s |
| (3) (1) – p, (2) – r, (3) – q, (4) – s | (4) (1) – q, (2) – p, (3) – r, (4) – s |

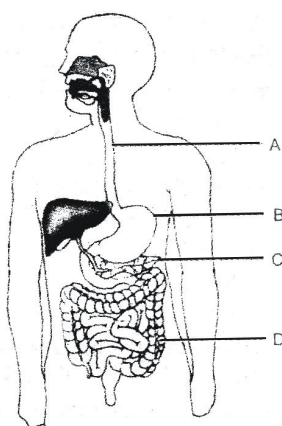
14. Match column-I with column-II and select the correct answer using the code given below the columns

Column-I

Column II

- | | |
|--|---|
| (1) Pancreas | (p) This organ secretes the enzymes amylase, trypsin and lipase. |
| (2) Rectum | (q) This is a storage site for faeces before being egested from the body |
| (3) Oesophagus | (r) This tube structure transports food from the buccal cavity to the stomach |
| (4) Oral cavity | (s) The structure where mechanical digestion of food first occurs |
| (1) (1) – p, (2) – q, (3) – r, (4) – s | (2) (1) – q, (2) – p, (3) – r, (4) – s |
| (3) (1) – r, (2) – p, (3) – q, (4) – s | (4) (1) – s, (2) – q, (3) – r, (4) – p |

15. From the given picture of the digestive system, identify the part where gastric glands are present.



- (1) A (2) B (3) C (4) D

16. Which of the following statements about the green plants is incorrect?

- (1) They synthesize carbohydrates from carbon dioxide and water in the presence of sunlight and chlorophyll
- (2) They store carbohydrates in the form of starch
- (3) They convert carbon dioxide and water into carbohydrates in the absence of sunlight
- (4) They constitute the first trophic level in food chains

17. Select the correct statement–

- (1) Heterotrophs do not synthesize their own food
- (2) Heterotrophs utilise solar energy for photosynthesis
- (3) Heterotrophs synthesize their own food
- (4) Heterotrophs are capable of converting carbon dioxide and water into carbohydrates

18. Choose the best definition of “Photosynthesis”

- (1) The process in which food is oxidised to release energy
- (2) The process by which organism ingests, digests, absorbs, transports and utilise nutrients and dispose off their end products
- (3) The process by which green parts of plant synthesize organic food in the form of carbohydrates from CO_2 and water in the presence of sunlight
- (4) None of these

19. Choose the best definition of “Parasitic Plant”.

- (1) Plants do not make their own food, but live and feed on host plant
- (2) Plants feed on dead matter instead of living on a host or making their own food
- (3) Some plants can kill and digest small creatures, such as insects
- (4) None of these

Assertion-reason (Q.20 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
- (2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
- (3) If assertion is true but reason is false
- (4) If assertion is false but reason is true

20. **Assertion** : Generally stomata are closed during night in plants.

Reason : The opening and closing of stomata is a function of guard cells.

21. **Assertion** : Amoeba shows holozoic mode of nutrition.

Reason : It is unicellular and omnivorous.

22. **Assertion** : Bile is not a true digestive juice.

Reason : Bile lacks digestive enzymes.

23. **Assertion** : Pancreas secrete digestive juice which has enzymes for digestion of carbohydrates, proteins and fats.

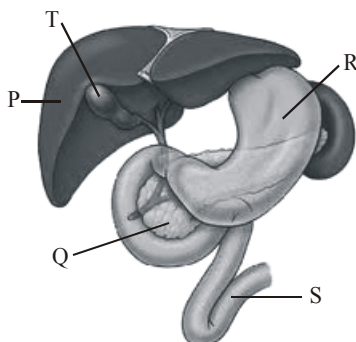
Reason : Digestion of carbohydrate begins in buccal cavity.

24. **Assertion** : Absorption of digested food mainly takes place in small intestine.

Reason : Villi present in small intestine increase the surface area for absorption of food.

Case based mcqs

25. The human digestive system consists of gastrointestinal tract plus the accessory organs of digestion. It involves breakdown of food into smaller components until they can be absorbed and assimilated in the body.



- (i) Identify the parts labelled as Q and S in the given diagram.
- (1) Stomach and gall bladder
 - (2) Gall bladder and pancreas
 - (3) Stomach and small intestine
 - (4) Pancreas and small intestine
- (ii) The table show nutrients present in four foods.

Food	Carbohydrate	Fat	Protein
P	✓	×	✓
Q	×	×	✓
R	×	✓	×
S	✓	✓	×

Which foods would be partly digested in the stomach?

- (1) P and Q (2) P and R (3) Q and S (4) R and S
- (iii) Only two of the following statements accurately describe what happens in the mouth?
- (a) Amylase breaks down large starch molecules into smaller maltose molecules.
 - (b) Chewing increases the surface area of food for digestion.
 - (c) Saliva emulsifies fats into smaller droplets.
 - (d) Enzyme pepsin acts on proteins.
- Which statements are correct?
- (1) a and b (2) b and c (3) c and d (4) a and d
- (iv) If we take food rich in lime juice, then
- (1) action of ptyalin on starch is enhanced
 - (2) action of ptyalin on starch is reduced
 - (3) action of ptyalin on starch is unaffected
 - (4) action of ptyalin on starch stops

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	1	2	2	2	3	3	1	3	2	3	2	1	1	2
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	3	1	3	1	2	2	1	2	1	4	1	1	2		

BIOLOGY

RESPIRATION

Multiple choice questions

1. Aerobic respiration is more advantageous than anaerobic respiration because
 - (1) It requires oxygen
 - (2) It produces more energy
 - (3) It causes incomplete break down of respiratory substrate
 - (4) All of the above
2. During respiration exchange of gases takes place in
 - (1) Pharynx and larynx
 - (2) Trachea
 - (3) Alveoli
 - (4) Ribs
3. Trunk of woody stem show gaseous exchange through
 - (1) Hairs
 - (2) Stomata
 - (3) Lenticels
 - (4) None of these
4. Common step for anaerobic and aerobic respiration is
 - (1) Cellular respiration
 - (2) Glycolysis
 - (3) Krebs's cycle
 - (4) None of these
5. Maximum respiratory enzymes are found in
 - (1) Cytoplasm
 - (2) Chloroplast
 - (3) Mitochondrial matrix
 - (4) None of these
6. Respiratory pigment is absent in
 - (1) Cockroaches
 - (2) Earthworms
 - (3) Prawn
 - (4) Snails
7. Cutaneous respiration is shown by
 - (1) Earthworms
 - (2) Leeches
 - (3) Frogs
 - (4) All of the above
8. Breakdown of food materials to release energy occur in
 - (1) Only green leaves
 - (2) Only non-green leaves
 - (3) Only stem
 - (4) All cells
9. The given flow chart shows one of the pathways of glucose breakdown. Identify 'P' and 'Q'.

$$\text{Glucose} \xrightarrow{\text{In cytoplasm}} \text{P} \xrightarrow{\text{In muscle cell}} \text{Q} + \text{Energy}$$

 - (1) Ethanol and carbon dioxide
 - (2) Pyruvate and carbon dioxide
 - (3) Pyruvate and lactate
 - (4) Ethanol and pyruvate
10. How is yeast useful in making wine and beer?
 - (1) they respire anaerobically producing alcohol
 - (2) they respire aerobically producing alcohol
 - (3) they respire anaerobically producing lactic acid
 - (4) none of these
11. The complete oxidation of pyruvate take place in
 - (1) cell cytoplasm
 - (2) nucleus
 - (3) mitochondrial matrix
 - (4) none of these
12. About 70% of CO_2 in blood is transported in the form of
 - (1) dissolved CO_2
 - (2) bicarbonates
 - (3) carbaminohaemoglobin
 - (4) carboxyhaemoglobin
13. In humans, which of the following is not a step in respiration?
 - (1) Alveolar diffusion of O_2 and CO_2
 - (2) Transport of gases by blood
 - (3) Diffusion of O_2 and CO_2 between blood and tissues
 - (4) Utilization of CO_2 by cells for catabolic reactions

14. Which of the following respiratory structures has cartilage rings to prevent it from collapsing?
 (1) Alveoli (2) Pharynx (3) Larynx (4) Trachea
15. Human skin cannot function as a respiratory organ because
 (1) It is not permeable to O_2 and CO_2 (2) It is rather thick
 (3) It is dry (4) All of the above
16. How oxygen enters in blood from alveoli of lungs?
 (1) By osmosis (2) By simple diffusion
 (3) By active transport (4) None of the above
17. Given are different parts of a respiratory tract.

(P)	Nasal cavity	(Q)	Alveoli
(R)	Larynx	(S)	Epiglottis
(T)	Trachea	(U)	Bronchus
(V)	Pharynx	(W)	Bronchioles

Which path a molecule of CO_2 in the alveoli of lung takes on its journey to the outside?

- (1) $Q \rightarrow W \rightarrow U \rightarrow T \rightarrow R \rightarrow S \rightarrow V \rightarrow P$
 (2) $Q \rightarrow W \rightarrow U \rightarrow R \rightarrow T \rightarrow S \rightarrow V \rightarrow P$
 (3) $Q \rightarrow U \rightarrow W \rightarrow R \rightarrow S \rightarrow T \rightarrow V \rightarrow P$
 (4) $Q \rightarrow U \rightarrow W \rightarrow T \rightarrow R \rightarrow S \rightarrow V \rightarrow P$
18. Lungs are respiratory organs of
 (1) Housefly (2) Fish (3) Earthworm (4) Mammals
19. Expiration involves
 (1) Relaxation of diaphragm and intercostal muscles
 (2) Contraction of diaphragm and intercostal muscles
 (3) Contraction of diaphragm muscles only
 (4) Contraction of intercostal muscles only

Assertion-reason (Q.20 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
 (2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
 (3) If assertion is true but reason is false
 (4) If assertion is false but reason is true

20. **Assertion** : Glycolysis is the first step of respiration in which glucose completely breaks into CO_2 and H_2O .
Reason : Glycolysis is a common step in both aerobic and anaerobic respiration.
21. **Assertion** : Plants do not have specialised respiratory system.
Reason : Plants respire in all of their individual part like leaf, stem and root.
22. **Assertion** : Waterlogged soil is physiologically dry soil.
Reason : This is due to more oxygen in soil.
23. **Assertion** : Presence of diaphragm is a feature of mammals.
Reason : Larynx is made of cartilage.
24. **Assertion** : Haemoglobin is the respiratory pigment in human beings.
Reason : It transports oxygen in the human body.

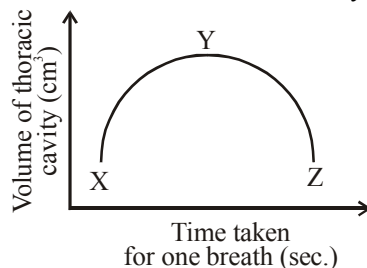
Case based mcqs

25. The stage of respiration during which air is inhaled into the lungs through the mouth or nose due to muscle contraction and then exhaled due to muscle relaxation is called breathing. Inhalation is intake of fresh air from outside into the alveoli of the lungs. The mechanism of breathing out of carbon dioxide is called exhalation.

(i) The breathing movements of the lungs in mammals are governed by

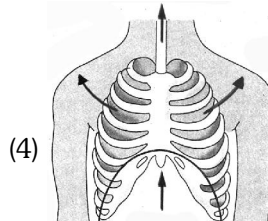
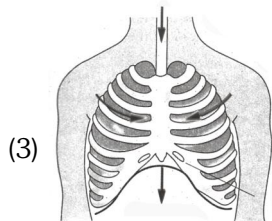
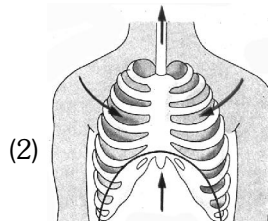
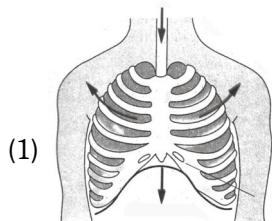
- (1) muscular walls of lung (2) diaphragm
(3) intercostal muscles (4) both (2) and (3)

(ii) The given graph shows changes in the volume of thoracic cavity in a normal human being while breathing.



Select the correct option regarding this.

- (1) From X to Y pressure in lungs increases whereas from Y to Z pressure in lungs decreases.
(2) From X to Y ribs move upward and outward whereas from Y to Z ribs move downward and inward.
(3) At point Y diaphragm is dome shaped whereas at points X and Z it is flat.
(4) X to Y represents exhalation and Y to Z represents inhalation.
- (iii) When we breathe in, we inhale many gases, including oxygen. What happens to the gases that the body can't use ?
- (1) They are exhaled.
(2) They are changed into oxygen by the lungs.
(3) They circulate through the body and are disposed off later.
(4) They are absorbed into the digestive system and used to create energy.
- (iv) Which figure illustrates the process of inhalation?



ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	3	3	2	3	1	4	4	3	1	3	2	4	4	4
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	2	1	4	1	4	1	3	2	1	4	2	1	1		

Multiple choice questions

1. Water will be absorbed by root hair when
 - (1) Concentration of solutes in the cell sap is high
 - (2) Plant is rapidly respiring
 - (3) They are separated from soil by permeable membrane
 - (4) Concentration of salts in the soil is high
2. Which one of the following is connected with translocation of food in plants?
 - (1) Phloem
 - (2) Xylem
 - (3) Meristem
 - (4) Cambium
3. During ventricular systole
 - (1) oxygenated blood is pumped into the pulmonary artery and deoxygenated blood is pumped into the aorta.
 - (2) oxygenated blood is pumped into the aorta and deoxygenated blood is pumped into the pulmonary vein
 - (3) oxygenated blood is pumped into the pulmonary vein and deoxygenated blood is pumped into the pulmonary artery
 - (4) oxygenated blood is pumped into the aorta and deoxygenated blood is pumped into the pulmonary artery.
4. The carbohydrate transported through phloem is mainly in the form of
 - (1) Glucose
 - (2) Starch
 - (3) Sucrose
 - (4) Glycogen
5. Which of the following contributes most to ascent of sap?
 - (1) Breakdown of ATP
 - (2) Root pressure
 - (3) Cohesion of water and transpiration pull
 - (4) Capillary rise of water in xylem
6. The transpiration in plants will be highest when
 - (1) There is high humidity in the atmosphere
 - (2) There is low water in the cell
 - (3) Environmental conditions are very moist
 - (4) Wind velocity is high
7. Rate of transpiration in a dorsiventral leaf is
 - (1) Greater at the upper surface
 - (2) Greater at the lower surface
 - (3) Equal at both the surfaces
 - (4) None of the above
8. Which of the following is not a function of transpiration?
 - (1) Excretion of minerals
 - (2) Cooling of leaves
 - (3) Uptake of water
 - (4) Uptake of minerals
9. Which of the following do not have valves?
 - (1) Arteries
 - (2) Veins
 - (3) Heart
 - (4) None of these
10. Which of the following is an active process?
 - (1) Translocation of food
 - (2) Transpiration
 - (3) Cohesion
 - (4) None of these
11. What do the erythrocytes pick up from the lungs and transport to rest of the body?
 - (1) NaCl
 - (2) Urea
 - (3) CO₂
 - (4) O₂
12. Lymph differs from the blood as it has
 - (1) Only RBCs and no WBCs
 - (2) More WBCs and fewer RBCs
 - (3) WBCs and no RBCs
 - (4) More RBCs and fewer WBCs

13. Blood vessels that connect arteries to veins are called
 (1) Neurons (2) Capillaries (3) Nephrons (4) Muscles
14. Vessel which carries blood from all the body parts except lungs to heart is
 (1) Aorta (2) Pulmonary vein (3) Pulmonary artery (4) Vena cava
15. Choose the schematic diagram which properly represents pulmonary circulation in humans.
 (1) Left ventricle $\xrightarrow{\text{Deoxygenated blood}}$ Lungs $\xrightarrow{\text{Oxygenated blood}}$ Right auricle
 (2) Left ventricle $\xrightarrow{\text{Oxygenated blood}}$ Lungs $\xrightarrow{\text{Deoxygenated blood}}$ Right auricle
 (3) Right ventricle $\xrightarrow{\text{Deoxygenated blood}}$ Lungs $\xrightarrow{\text{Oxygenated blood}}$ Left auricle
 (4) Right auricle $\xrightarrow{\text{Oxygenated blood}}$ Lungs $\xrightarrow{\text{Deoxygenated blood}}$ Left ventricle
16. Which of the following has the thickest wall?
 (1) Right ventricle (2) Left ventricle (3) Right atrium (4) Left atrium
17. Which type of blood vessels carry blood away from the heart?
 (1) Pulmonary vein (2) Vena cava (3) Pulmonary artery (4) None of these
18. Fishes have
 (1) Double Circulation (2) Single circulation (3) Open circulation (4) Pulmonary circulation
19. Instrument used to measure blood pressure is
 (1) Hygroscope (2) Sphygmomanometer (3) ECG (4) None of these

Assertion-reason (Q.20 to 24)

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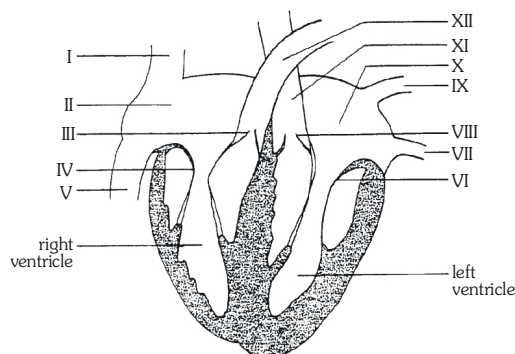
20. **Assertion** : Lymph flows in one direction only i.e. from tissues to heart.
Reason : It consists of plasma proteins, RBCs and WBCs.
21. **Assertion** : Ascent of sap is always unidirectional.
Reason : Translocation of food in plants is bidirectional.
22. **Assertion** : Mitral valve present in heart separates left atrium from left ventricle.
Reason : Tricuspid valve separates the right atrium from right ventricle.
23. **Assertion** : In veins blood flows smoothly without jerks.
Reason : Veins take the blood away from heart to different parts of body.
24. **Assertion** : Translocation of food is an active process.
Reason : It occurs through phloem.

Case based mcqs

25. The heart is a muscular cone-shaped organ about the size of a clenched fist of the same person.
 It is located in the upper body (chest area) between the lungs, and with its broad base facing upward and backward and narrow apex directed downwards, forwards and slightly towards the left.
 (i) Choose the wrong statement.

- (1) Heart has the size of a clenched fist of the same person.
- (2) Heart is protected by a double walled sac called pericardium.
- (3) Human heart has four chambers, two relatively large upper chambers called atria and two smaller lower chambers called ventricles.
- (4) Heart is divided into separate right and left sections by the septum.

Direction: The following diagram refers to questions (ii) and (iii).



- (ii) Blood rich in oxygen enters the heart through
 - (1) I and V
 - (2) VII and IX
 - (3) XI
 - (4) XII
- (iii) Which of the following structures prevent the backflow of blood into the atria?
 - (1) III and IV
 - (2) IV and VI
 - (3) III and VIII
 - (4) II and X
- (iv) What are the states of the valves when the ventricles are relaxed?

Atrio-ventricular valves

- (1) Open
- (2) Open
- (3) Closed
- (4) Closed

Semilunar valves in the arteries

- Open
- Closed
- Open
- Closed

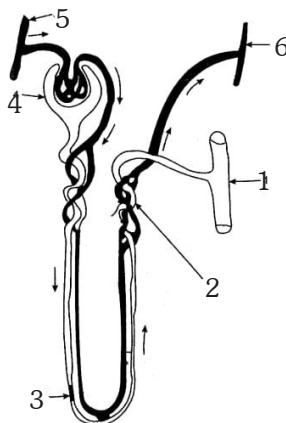
ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	1	4	3	3	4	2	1	1	1	4	3	2	4	3
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	2	3	2	2	3	2	2	3	2	3	2	2	2		

Multiple choice questions

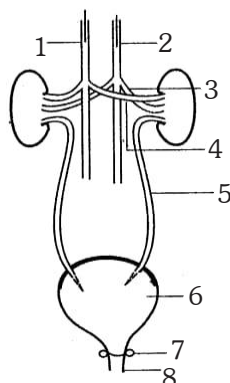
1. Choose the incorrect match of the function with the part of excretory system performing it.
(1) Regulates water content and filters blood ----- Kidney
(2) Carries deoxygenated blood away from the kidneys ----- Renal vein
(3) Carries oxygenated blood to the kidneys ----- Renal artery
(4) Carries urine from the kidneys to the bladder ----- Urethra
2. Which one of the following is NOT present in urine?
(1) Salts (2) Salivary amylase (3) Urea (4) Water
3. Fill in the blanks with correct option.
Tapeworm :: (a) :: Ammonia
(b) :: Nephridia :: (c)
(1) a - Ammonia, b - Cockroach, c - Urea
(2) a - Flame cells, b - Earthworm, c - Ammonia
(3) a - Body surface, b - Amoeba, c - Uric acid
(4) a - Flame cells, b - Hydra, c - Ammonia
4. The process by which water and nutrients are passed from the filtrate back into the blood is known as
(1) tubular secretion (2) tubular reabsorption (3) tubular excretion (4) filtration
5. Through which organs do humans excrete salts?
(1) Lungs and skin (2) Kidneys, lungs and skin
(3) Kidneys and lungs (4) Kidneys and skin
6. Formation of urine is a continuous process but urine is not passed out of the body continuously because of
(1) Urinary bladder (2) Cloaca (3) Rectum (4) Ureter
7. Blood loaded with urea is brought to kidney by
(1) Renal artery (2) Renal vein (3) Radial artery (4) None of these
8. Malpighian body is constituted by
(1) Glomerulus only
(2) Glomerulus and Bowman's capsule
(3) Glomerulus and efferent vessel
(4) Glomerulus, Bowman's capsule and PCT
9. The composition of dialysing fluid is same as plasma except that
(1) it has more nitrogenous waste
(2) it does not have nitrogenous wastes
(3) it has blood cells
(4) it does not have glucose
10. Which of the following statements is incorrect?
(1) Kidneys are the excretory organs in all vertebrates
(2) Ornithine cycle occurs in liver
(3) Bowman's capsule and PCT of a nephron lie in renal medulla.
(4) Many plant waste products are stored in vacuoles.

11. Which of these parts in the given figure are NOT correctly labeled 1, 2, 3, and 4.



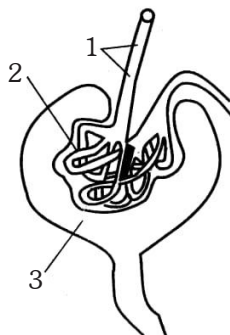
- (1) (1) ----- Collecting duct
 (2) (2) ----- Proximal convoluted tubule
 (3) (3) ----- Loop of Henle
 (4) (4) ----- Bowman's capsule

12. Identify the correctly matched main function and the parts labeled 5, 6, 7 and 8 in the given figure.



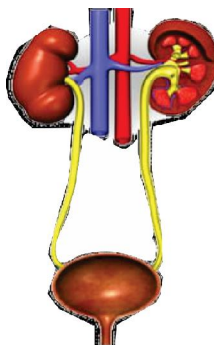
- (1) (5) Urethra-----Carry urine to the bladder.
 (2) (6) Urinary bladder----- filter blood
 (3) (8) Urethra-----Carries the urine to outside
 (4) (8) Ureter-----Store urine

13. What is the technical term given to the process occurring in 2 and 3 ?



- (1) Selective reabsorption
 (2) Ultrafiltration
 (3) Secretion
 (4) Diffusion

14. The diagram below shows the excretory system of a human being.



Name the endocrine gland which could be added in the diagram with its location/position.

- (1) Adrenal ----- above each kidney
 - (2) Pituitary ----- above urinary bladder
 - (3) Thyroid ----- below urinary bladder
 - (4) Adrenal ----- below each kidney
15. Where is the glomerulus found?
- (1) Around a convoluted tubule
 - (2) In the loop of Henle
 - (3) In the Bowman's capsule
 - (4) All of these
16. Choose the correct sequence to fill in the blanks appropriately.
- | Organ | Excretory wastes |
|--|--|
| (a) Kidneys | _____ |
| (b) Lungs | _____ |
| (c) Skin | _____ |
| (1) a-urea, b-CO ₂ , c-salt | (2) a-urea, b-salt, c-CO ₂ |
| (3) a-CO ₂ , b-urea c-salt | (4) a-salt, b-CO ₂ , c-bile |
17. Which of these is an excretory waste in plants?
- (1) Tannin
 - (2) Resin
 - (3) Essential oils
 - (4) All of these
18. How is excess water removed in plants?
- (1) Through stomata
 - (2) Through stomata and lenticels
 - (3) Through lenticels
 - (4) Through lenticels and root hairs
19. The epithelial tissue which lines the proximal convoluted tubule is
- (1) Simple squamous epithelium
 - (2) Columnar epithelium
 - (3) Stratified epithelium
 - (4) Cuboidal epithelium

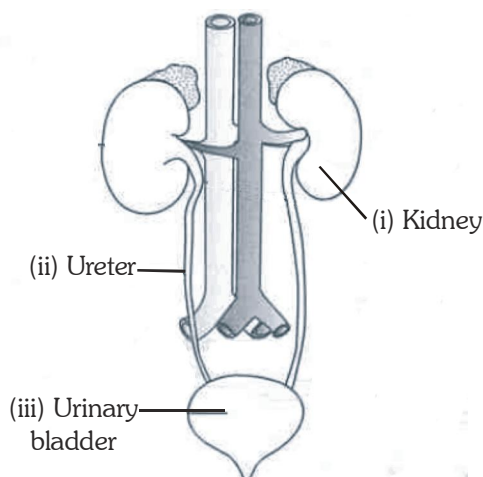
Assertion-reason (Q.20 to 24)

- (1) If both assertion and reason are correct and reason is the correct explanation of the assertion
 - (2) If both assertion and reason are correct but reason is not the correct explanation of the assertion
 - (3) If assertion is true but reason is false
 - (4) If assertion is false but reason is true
20. **Assertion** : Frogs and mammals are said to be ureotelic animals.
Reason : It is because of the fact that their main nitrogenous waste product is urea.
21. **Assertion** : Comparative to uric acid, urea requires more water for excretion.
Reason : Birds and insects are uricotelic animals.

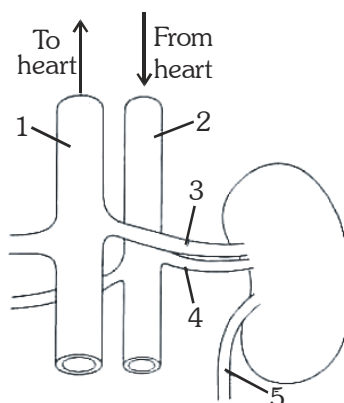
- 22. Assertion** : Each kidney is covered by a tough fibrous capsule of connective tissue.
Reason : In humans, right kidney is located at a slightly lower position than left kidney.
- 23. Assertion** : In absence of ADH, water re-absorption from DCT is considerably reduced.
Reason : The antidiuretic hormone increases the water permeability of distal convoluted tubule.
- 24. Assertion** : Many plant waste products are stored in vacuoles present in cells.
Reason : Aquatic plants lose most of their metabolic wastes by transpiration.

Case based mcqs

- 25.** The excretory system is a biological system that removes excess, unnecessary materials from the body fluids of an organism, so as to help maintain internal chemical homeostasis and prevent damage to the body.



- (i) Choose the correct path of urine in our body
 (1) Kidney - Ureter - Urethra - Urinary bladder
 (2) Kidney - Urinary bladder - Urethra - Ureter
 (3) Kidney - Ureter - Urinary bladder - Urethra
 (4) Urinary bladder - Kidney - Ureter - Urethra
- (ii) The main function of ureter is
 (1) store urine till it is released out
 (2) carry urine from kidney to urinary bladder
 (3) guard the urethra
 (4) passage through which urine is excreted out of the body
- (iii) The diagram shows a kidney and its associated vessels.



Which structure has the most and least urea concentration?

	Most	Least
(1)	1	2
(2)	4	1
(3)	4	3
(4)	5	3

(iv) If Henle's loop were absent from mammalian nephron, which one of the following is to be expected?

- (1) There will be no urine formation
- (2) There will be hardly any change in the quality and quantity of urine formed
- (3) The urine will be more concentrated
- (4) The urine will be more dilute

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	2	2	2	4	1	1	2	2	3	2	3	2	1	3
Que.	16	17	18	19	20	21	22	23	24	25(i)	25(ii)	25(iii)	25(iv)		
Ans.	1	4	2	4	1	2	2	1	3	3	2	4	4		